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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/651,783	08/30/2000	Shuichi Kanno	NIP-198	2461

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EXAMINER	
NGUYEN, NGOC YEN M	
ART UNIT	**PAPER NUMBER**
1754	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/651,783	KANNO ET AL.	
	Examiner	Art Unit	
	Ngoc-Yen M. Nguyen	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3,4,11-14,16 and 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3,4,11-14,16 and 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 April 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 10, 2007 has been entered.

The amendment filed April 10, 2007 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the amendment to paragraph 17 on page 12 of the specification is considered as new matter, "the *mist separating apparatus* has a *direct* piping connection 62 ... and a *direct* piping connecting ... storage tank", for the Figure 1, only a *cyclone* mist separating apparatus is shown, not a generic "separating apparatus", also, from Figure 1, the piping connections 62, 64 connect the lower liquid and the upper waste outlets, respectively to the storage tank, however, if the word "direct" is intended to exclude any extra features in these piping connections, there are no sufficient support for such "negative limitation", the mere absence of a positive recitation is not basis for an exclusion, Ex parte Grasselli, 231 USPQ 393 (Bd. App. 1983), aff 'd mem., 738 F.2d 453 (Fed. Cir. 1984).

Applicant is required to cancel the new matter in the reply to this Office Action.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 3-4, 11-14, 16-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicants are requested to point out support in the instant specification, by page and line numbers, for the limitations "a filter type mist separator ...such that the removed mist is then discharged through a lower liquid waste outlet in a form of liquid or a gather of mists, and residual mists not removed by ... said filter type mist separator are discharged... through an upper liquid waste outlet provided at an entry end of a rear stage of... said filter type mist separator installed in the emission side of said gas exhausted in said exhausting step" as required in the instant claims 3-4, 11, 17. Applicants point out that support for the limitation "wherein said step of removing mist...in said exhausting gas" can be found on page 5, line 10 to page 6, line 14 of the instant specification and Figures 2(A) and 2 (B). Such disclosure in the specification may provide sufficient support for the claimed limitation when the "mist removal means"

is cyclone mist separator as shown in Figures 2(A) and 2(B), but not for the generic "mist removal means" as required in Applicants' claims because the claimed "mist removal means" can be a filter mist separator (as shown in Figure 3). There is no disclosure in the instant specification or in Figure 3 that there were 2 liquid outlets for the filter mist generator or the electric dust generator. For the filter type separator, it should be noted that there is no "upper liquid waste outlet" at an entry end of a rear stage of said filter type mist separator installed in the emission side of said gas exhausted in said exhausting step. As shown in Figure 3, the only disclosed liquid is the "liquid accompanied with the gas passed through the filter is exhausted to outside the cylinder through liquid outlet 36", there is no other disclosure of a second liquid outlet for the filter type mist separator.

Applicants are also requested to point out support in the instant specification, by page and line numbers, for the limitation of "decomposing a toxic component containing at least one of SO_3, HF, NO, NO_2, ... produced by said decomposition of PFC ... at the rear stage of said PFC decomposition process". It should be noted that in the instant specification, it is disclosed that SF_6 and NF_3 are decomposed into SO_3, HF, NO, NO_2 (note equation 1 and 2 on page 4) and these decomposition products "can be removed from the decomposed gas by washing with water or an alkaline aqueous solution" (note page 4, lines 11-13), not by contacting with "a toxic component removing catalyst". Also, on page 12 of the instant specification, it is disclosed that PCF decomposition catalyst 8 and hazardous component removing catalyst 9 are packed into the PFC decomposition tower 1 and the hazardous component here means CO, SO_2F_2, and the

like (note page 12, lines 3-8 and page 14, lines 18-25 which mention "SO_2F_2 decomposition catalyst"). There is no disclosure in the instant specification to indicate that the "decomposition products" from decomposing PFC and the "hazardous component" are the same, i.e., there is no disclosure to show that CO and SO_2F_2 are obtained after decomposing a PFC gas that contains at least one of SF_6 and NF_3. There is no support in the instant specification for the two-step decomposing process as now required in the instant claims.

There is no support for "direct" piping connections as required in the instant claims, note the objection to the specification above. Also, there is no support for the "piping connections" for the filter type mist separator, it should be noted that if the second liquid outlet for the filter type mist separator was the exhaust pipe from washing tower "13" as shown in Figure 3, there would be no "direct piping connection" from the exhaust pipe from washing tower "13" to the storage tank, as evidenced by Figure 1, such exhaust pipe only connect to the inlet of the mist separator apparatus, not the storage tank.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3-4, 11-14, 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0 885 648 in view of JP 11-216,455 and Lang et al (6,235,256).

EP '648 discloses a process for decomposing fluorine compounds, comprising the steps of contacting a gas flow containing the fluorine compounds, which comprises fluorine as a halogen element, and any of the elements carbon, nitrogen and sulfur as a compound with the fluorine, with a fluorine compound-decomposition catalyst in the presence of steam to hydrolyze the fluorine compound in said gas flow, wherein said gas flow containing said fluorine compounds is contacted with a catalyst comprising Al to convert said fluorine compounds to hydrogen fluoride (note claim 1). In the equation 4 and 5 on page 3 of EP '648, when SF_6 or NF_3 is being decomposed, SO_3 or NO is formed. In the embodiments 6 and 7, SF_6 or NF_3 is diluted with air or nitrogen, the resulting gas is contacted with a catalyst to decompose the fluorine compound. The decomposed gas is scrubbed in an alkaline scrubber (note page 10, lines 1-25).

EP '648 discloses that sulfur oxides such as SO_2, SO_3 and the like, and nitrogen oxides, such as NO, NO_2, and the like, are generated in some cases. In order to neutralize and eliminate these products, a method of scrubbing the decomposed gas by spraying an aqueous alkaline solution is desirable (note paragraph bridging pages 3-4). Thus, the scrubbing step is considered as the step of removing SO_x and NO_x from the washed gas.

For the second "decomposing" step, i.e. "decomposing a toxic component...at the rear stage of said PFC decomposing process", this claim is read in light of the specification that there are two separate catalysts, i.e. catalyst "8" and catalyst "9", to

remove different components in the PFC gas simultaneously in a single process step (note instant specification, page 14, under "(Embodiment 1)". EP '648 discloses that the stream to be treated can contain more than one fluorine compound and the catalyst can contains at least one element selected from the group consisting of Zn, Ni, Ti, Fe, Sn, Pt, Co, Zr, Ce, and Si in additional to Al (note page 3, lines 8-15). Thus, when more than 1 element was used in addition to Al, the first element with Al is considered as the claimed "decomposition catalyst" and the second element with Al is considered as the claimed "toxic component decomposition catalyst".

The difference is EP '648 does not disclose the step of removing SO_x or NO_x from the decomposed gas after scrubbing by passing the gas after the scrubbing step through a cyclone or demister.

JP '455 discloses a process for treating an exhaust gas generated in a process of making printed circuit board by passing the exhaust gas through a catalytic thermal decomposition device 4 and the waste gas cleaning device 5 and discharged as a harmless exhaust gas 6 (note English abstract). As shown in Figure 3, the exhaust gas after scrubber 5 is introduced into a cyclone 8. Here the moisture within the exhaust gas is removed and recycled back to the scrubber 5 thereby minimizes the requirement of fresh scrubbing liquid. JP '455 further teaches that a demister can be used instead of a cyclone (note paragraph 0036).

For the limitation of " the removed mist is then drained through a liquid waste outlet... in the emission said of said gas exhausted in said exhausting step", since JP '455 desires to recycle the moisture back to be used as scrubbing liquid, it would have

been obvious to one skilled in the art to recover such moisture in the form of a liquid and it would also have been obvious to one skilled in the art to repeat the moisture removing step and to select proper equipment to effectively recover and recycle as much as possible of the moisture in the exhaust gas.

For the instant claim 16, it would have been obvious to one of skill in the art to optimize the inlet velocity to effectively remove the moisture from the exhaust gas and to select an appropriate material for the construction of the cyclone to withstand the condition of the process.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to pass the exhaust gas after the scrubbing step in EP '648 to a cyclone or demister, as suggested by JP '455, because by doing so, the moisture can be removed from the gas and recycled to the scrubber thereby minimizes the requirement of fresh scrubbing liquid. Such step would inherently remove any remaining NO_x or SO_x from the washed gas.

Lang '256 is further applied to disclose a process for scrubbing acid gases, in which, the improvement is a demister arranged at a location after the liquid droplets have been sprayed by the spray means into the flow path of the flue gases (note column 3, lines 8-43 and claim 1). The demister can be a two-level demister, i.e. two demisters (note column 2, lines 36-38 and claim 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to pass the exhaust gas of EP '648 to a demister, as suggested by

Lang '256 in order to obtain the advantages as disclosed in Lang '256 (note, for example, column 1, lines 44-50).

Claims 3-4, 11-14, 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanno et al (PGPub US 2001/0001652) in view either JP 11-216,455 and Lang et al (6,235,256).

Kanno '652 is an US counterpart of EP '648.

Kanno '652 discloses a process as mentioned for EP '648 (note claim 1, Examples 11-12).

The difference is Kanno '652 does not disclose the step of removing NO_x or SO_x after the scrubbing steps.

JP '455 and Lang are applied to teach the step of passing the gas after the scrubbing step to a cyclone or demister.

Applicant's arguments filed April 10, 2007 have been fully considered but they are not persuasive.

Applicants argue that the filter type mist separator remove mist from the gas passing there through and the portion of the mist removed by the filters 32 and 33 drops to the bottom of the lower chamber of the filter type separator shown in Fig. 3 and is removed out through the outlet at the bottom thereof.

In Applicants' specification, page 6, lines 15-28, it is disclosed that the gas is introduced into the cylinder from the bottom portion and exhausted from the top portion

and the "liquid accompanied with the gas passed through the filter is exhausted to outside of the cylinder through liquid outlet 36", there is disclosure of the mist removed by the filters drops to bottom as argued by Applicants.

Applicants argue that as described on page 13 of the specification, a direct piping connection 62 connects the bottom of the mist removal device 21 directly with liquid waste storage tank 18. This constitutes a clear teaching and support for a second liquid outlet in the lower stage of the filter separator of Figure 3.

It should be noted that Figure 1 is for a cyclone type mist separator only. Again, as stated in the 112, first paragraph rejection, there is no support for the "direct connection" between the "lower liquid waste" to the waste tank for the filter type mist separator.

Applicants argue that as shown in Figure 1, it is clearly shown that PFC is decomposed first at the PFC decomposition catalyst 8 into hazardous substances such SO_3, HF, NO, NO_2, CO, SO_2F_2, and then such substances are decomposed at the hazardous component removing catalyst 9.

Granted that PFC is decomposed first at the PFC decomposition catalyst, but the decomposition products such as SO_3, HF, NO, NO_2 are not disclosed in Applicants' specification as "hazardous components" and the disclosed hazardous components CO, SO_2F_2 are not produced by the decomposition of PFC.

Applicants argue that EP '648 discloses gas washing tank 20, a storage tank, but does not include any teaching for the direct discharging of mist separated by a mist separating apparatus to the storage tank.

In EP '648, the gas washing tank 20, the storage tank, as mentioned by Applicants above, cannot be found. However, for the argument regarding the mist separating apparatus, EP '648 is not relied upon to teach such feature. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). JP '455 or Lang '256 is applied to teach the use of a mist separating apparatus.

Applicants argue that Lang '256 does not describe or suggest any of the mist separating methods apparatuses that the claimed invention defines.

Lang is now applied to teach that two demisters can be used to effectively remove mists from exhaust gases.

Applicants argue that JP '455 does not indicated the direct discharging of the mist separated at the mist separating apparatus, or a storage tank.

JP '455 fairly teaches that the mists or moisture removed by the cyclone, i.e., a mist separating apparatus, can be recycled back to the scrubber and it would have been well within the skill of the artisan to provide a storage tank to serve as a buffer tank in order to regulate the amount and/or rate of the recovered moisture back to the scrubber.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner is currently on a Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ngoc-Yen M. Nguyen
Primary Examiner
Art Unit 1754

nmn
May 14, 2007